

# Rabies Update Arizona



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State Public Health Veterinarian

# Rabies Statistics

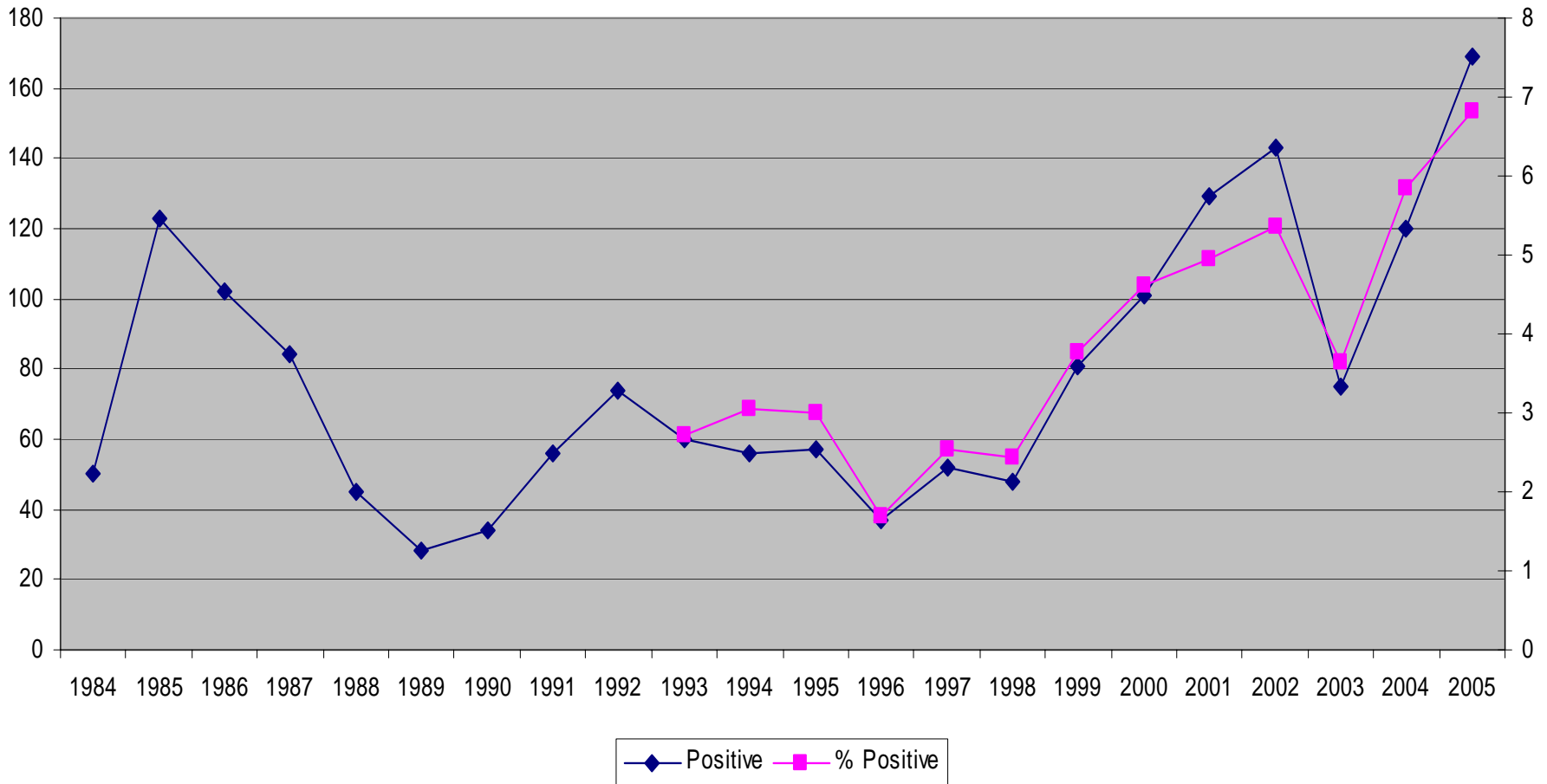


- 2,551 animals submitted to ASHL in 2005
- 2,481 tested
  - ~58.2% domestic
  - ~41.8% wild
- 2005- 169 positive (6.8%) – highest on record/yr

Year	Rabid Animals
2001	129
2002	143
2003	75
2004	120
2005	169

# Rabies in AZ 1984 - 2005

## Comparison of Positives & Percent Positives



# Lab Confirmed Rabid Animals

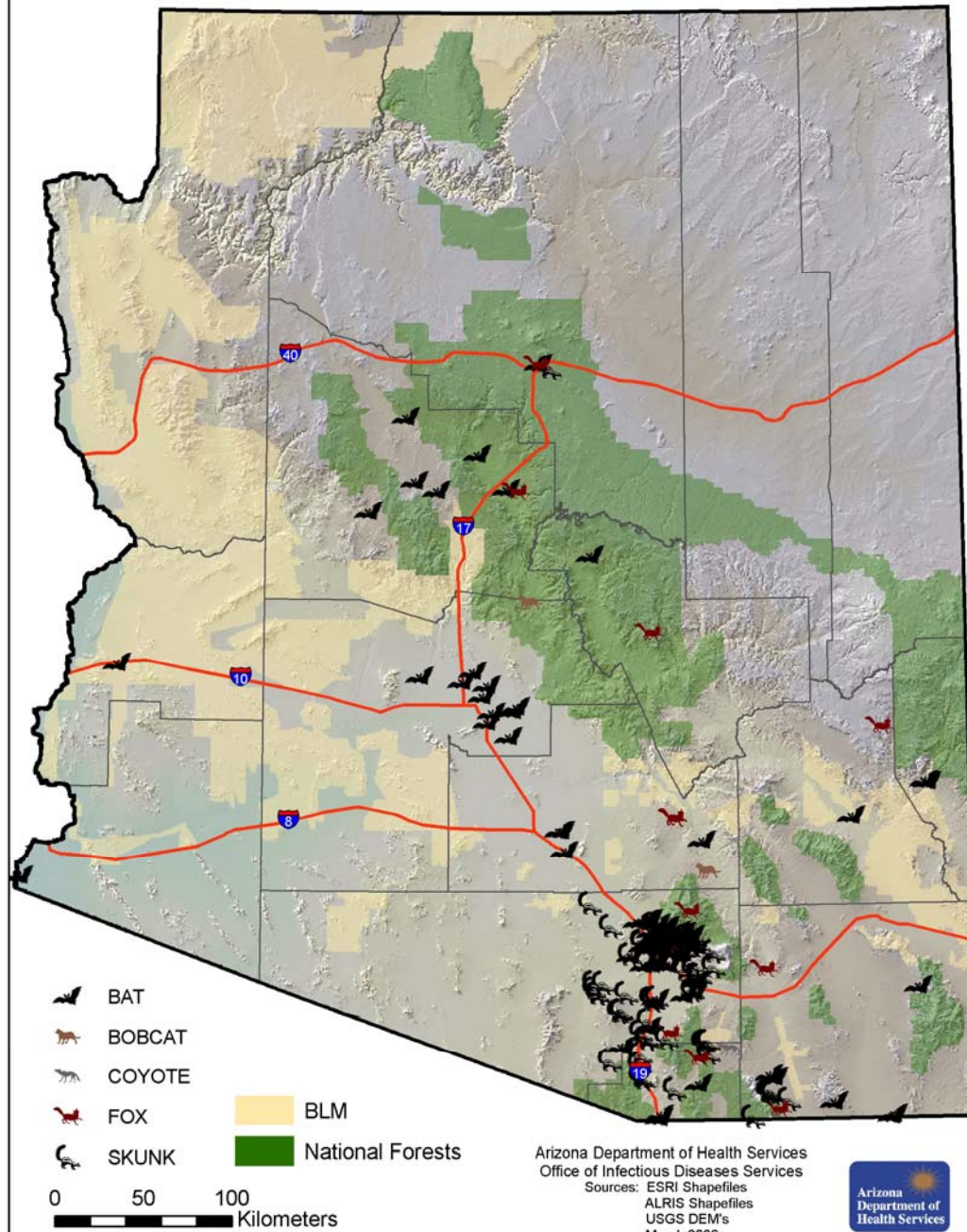
## 2005

- 84 bats (out of 454 tested) = 18.5% pos
  - 48 from Pima County, 11 in Maricopa County
  - Majority – Mexican free-tailed Bats
  - Multiple incidents of bats on school grounds
- 67 skunks (out of 453 tested) ~14.8%
  - 1 in Coconino County – Flagstaff– bat variant
  - 55 in Pima County – multi-focal epizootic, 1 raccoon in Tucson- skunk variant
- 12 fox (out of 25 tested)
  - Positive fox in Coconino County – west side of Flagstaff, near Thorpe Park, carrying same bat variant as skunks in Flagstaff

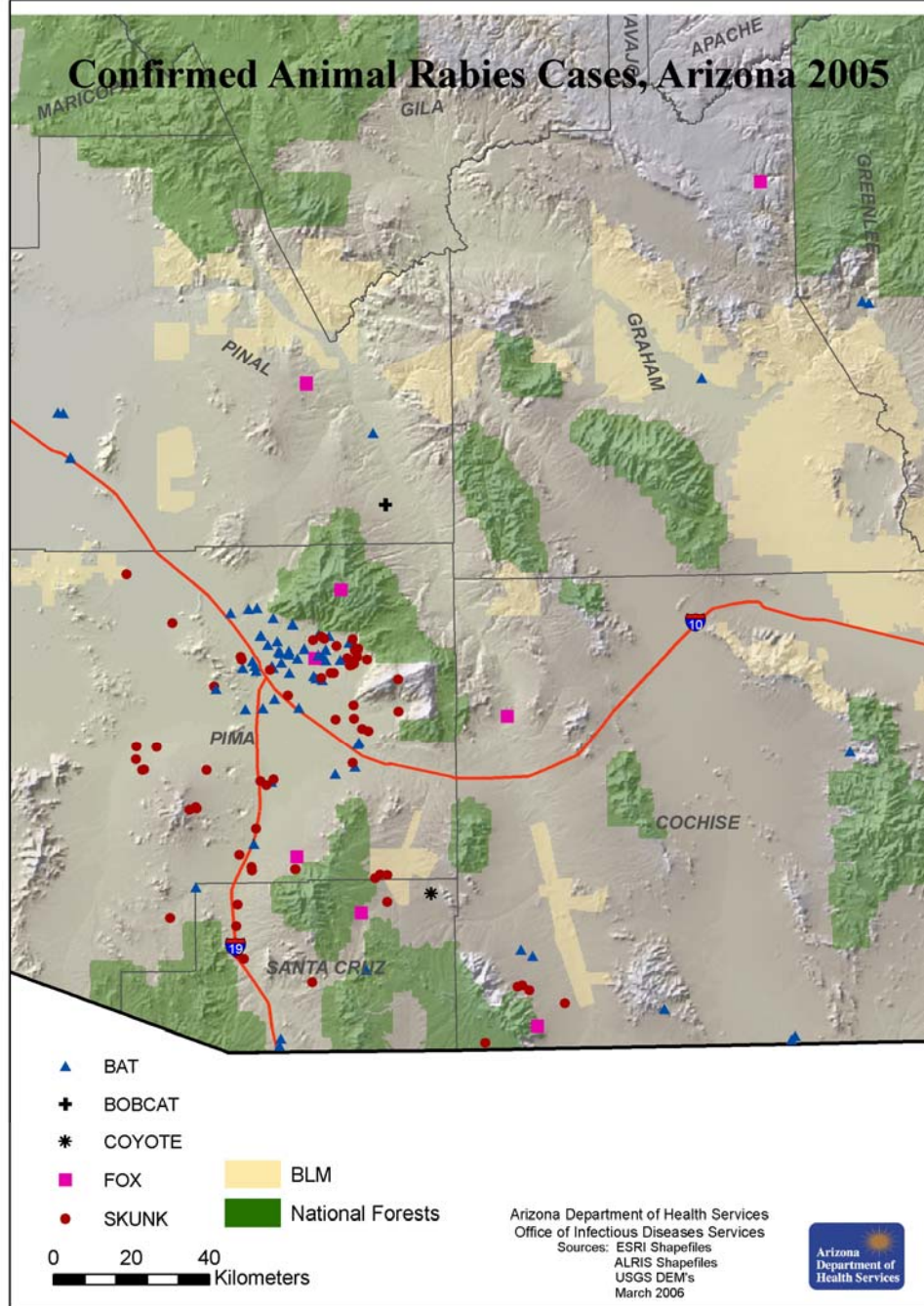




# Confirmed Animal Rabies Cases, Arizona 2005



# Confirmed Animal Rabies Cases, Arizona 2005



# Rabies in Flagstaff

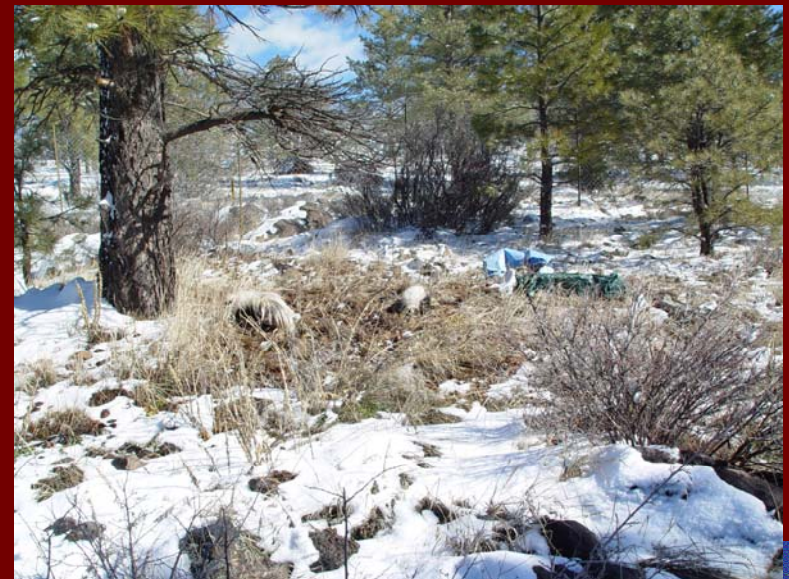
- Variant associated with Big Brown Bat from western U.S.
- After 3 years of no cases p/ TVR in 2001; 217 skunks vaccinated & tagged
- 2004 – 5 skunks (60 tested)
- 2005 – 1 skunk (190 tested)
- All in Fox Glenn/Continental Estates neighborhood



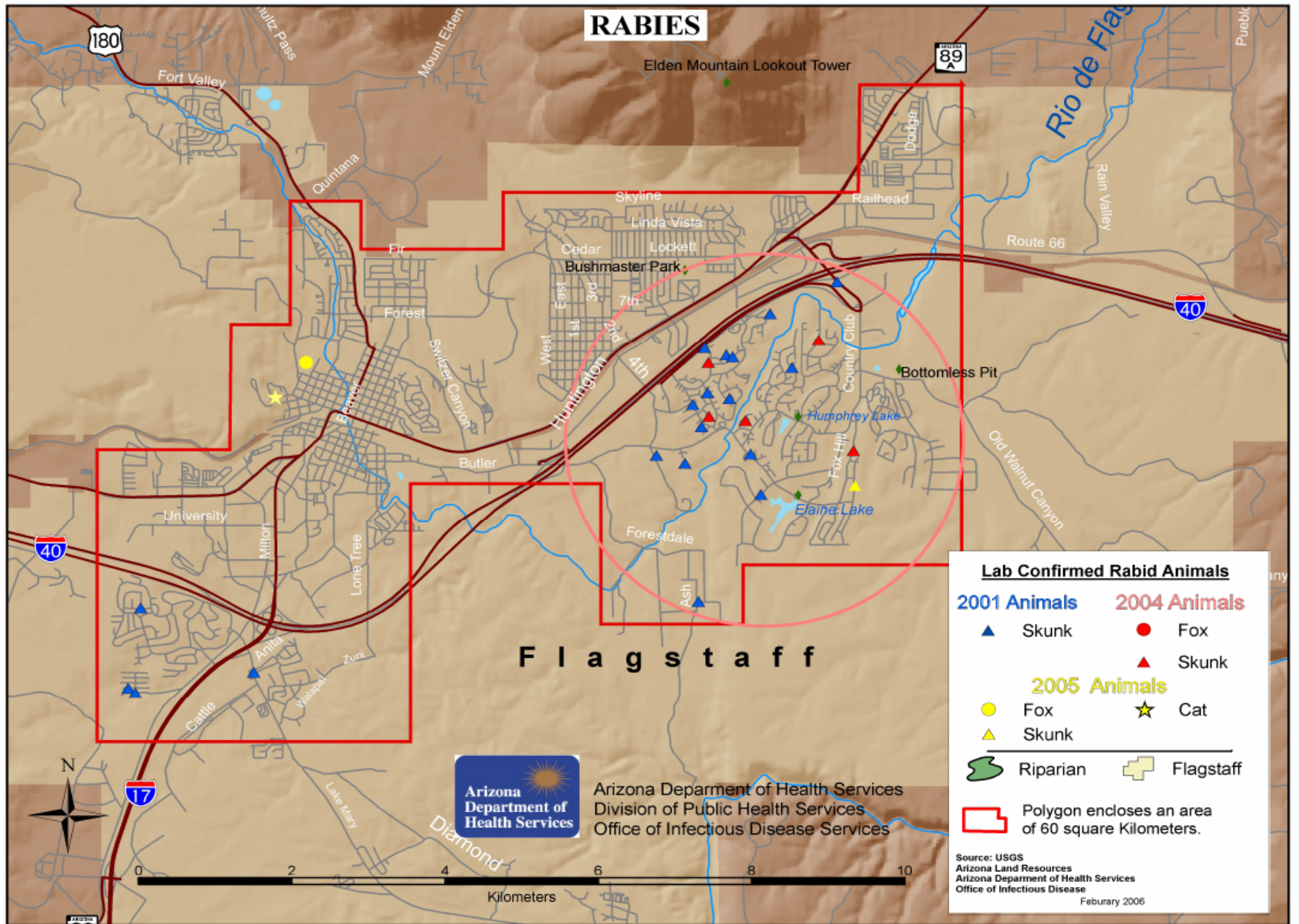


# ORV for skunks

- 1<sup>st</sup> field trial of oral rabies vaccine in skunks
- Vaccinia-rabies glycoprotein recombinant virus inside fish meal coated sachets
- April 17<sup>th</sup>, Flagstaff – distribution of 1,700 sachets over 22.5 sq. km – by hand
- 75 baits/ sq. km
- Baiting stations as well







# ORV assessment

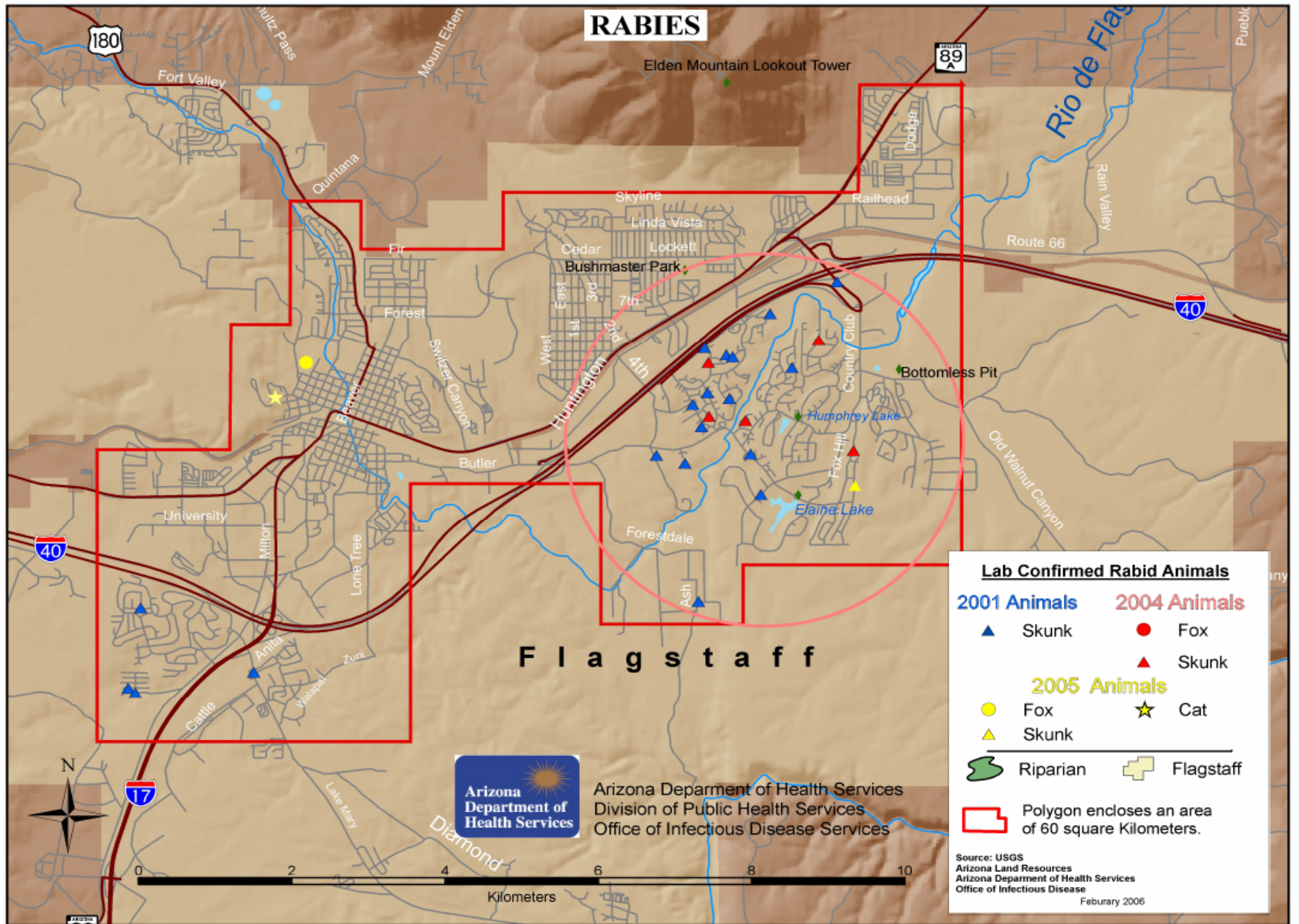
- 6 weeks later – assessment of serum antibody levels & bait acceptance of 24 skunks in area & in remote area as control group
- Only 6 skunks trapped in neighborhood
- 1 with titer for rabies – insufficient for protection
- Small remaining population due to rabies, as well as nuisance trapping & euthanasia
- few complaints from residents
- No reports of ORV exposure to humans/pets by residents

# Rabies in Flagstaff

- Sept 2005 - domestic pet cat
  - Owned, but most likely never vaccinated for rabies
  - Allowed to roam during day
  - Many skunks in neighborhood
  - PEP recommended for owner, 2 friends, & 5 vet clinic staff
- Oct 2005 – gray fox, near Thorpe Park
  - Family of fox living under shed at local armory
  - Additional carcass found
- Both big brown bat variant







# Rabid Cats

- 3 rabid cats from Sept 2005 - Jan 2006
- 2 from Santa Cruz County
- 7 yr old adult, spayed cat from Rio Rico
  - previously vaccinated 2x
  - **AZ gray fox variant**
  - PEP – 4 veterinary clinic staff
- 6 wk old kitten- 1 of 4 litter mates from Tumacacori
  - Skunk chased kittens 4 weeks prior to onset, only 2 days prior to litter being given to friend in Amado
  - 2 remaining litter mates
  - Multiple dogs exposed to kittens and to original incident with skunk
  - **Skunk variant**
  - PEP – owner & 2 friends



# Confirmed Rabid Cats - AZ

Year	No. of cases	Location
1982	1	Phoenix –vaccine associated
1987	2	Clifton and Tombstone
1989	2	Tucson and Pinal County
1990	3	2 Pima County, 1 Pinal County
2005	2	Flagstaff & Rio Rico
2006 to date	1	Tumacacori



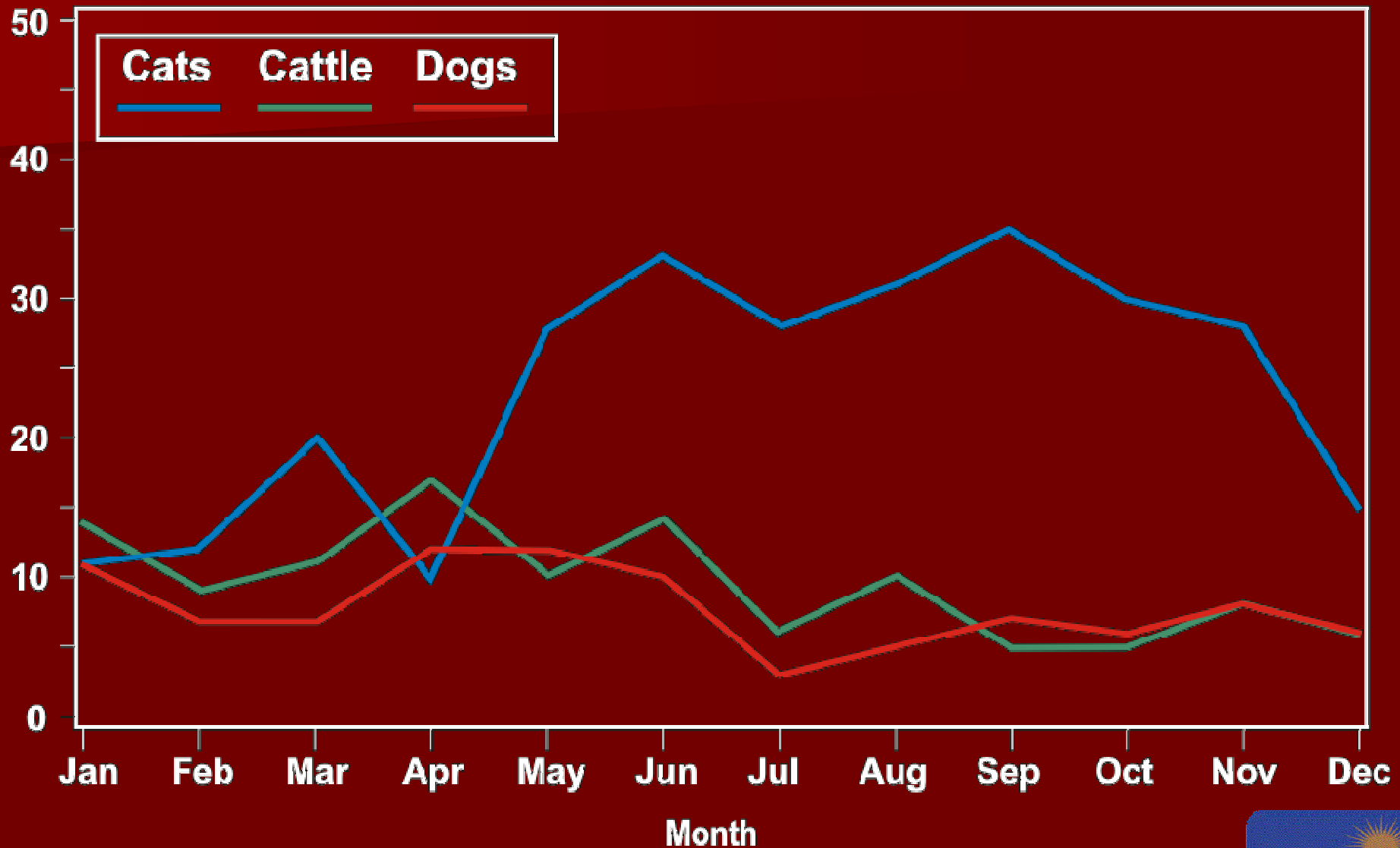
# Rabid Cats

- National trend = **more rabid cats/year than rabid dogs/year**
- Due to lower vaccination rate of cats
- Perhaps partly due to more roaming (e.g. climb over property walls)
- Feral cats share habitat with skunks and raccoons

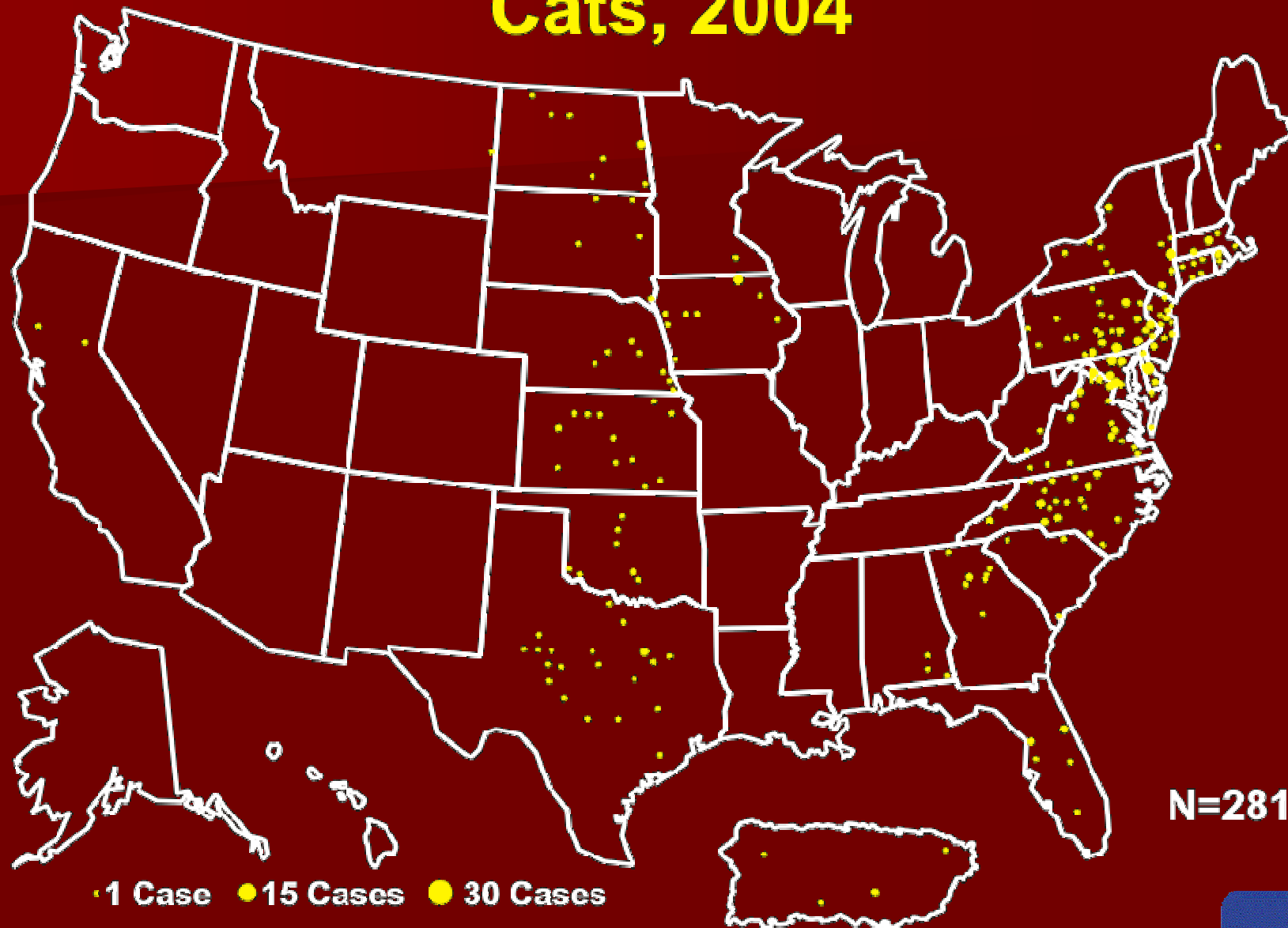


Photo -USDA, APHIS, Wildlife Services

# Rabies in Domestic Animals by Month, 2004

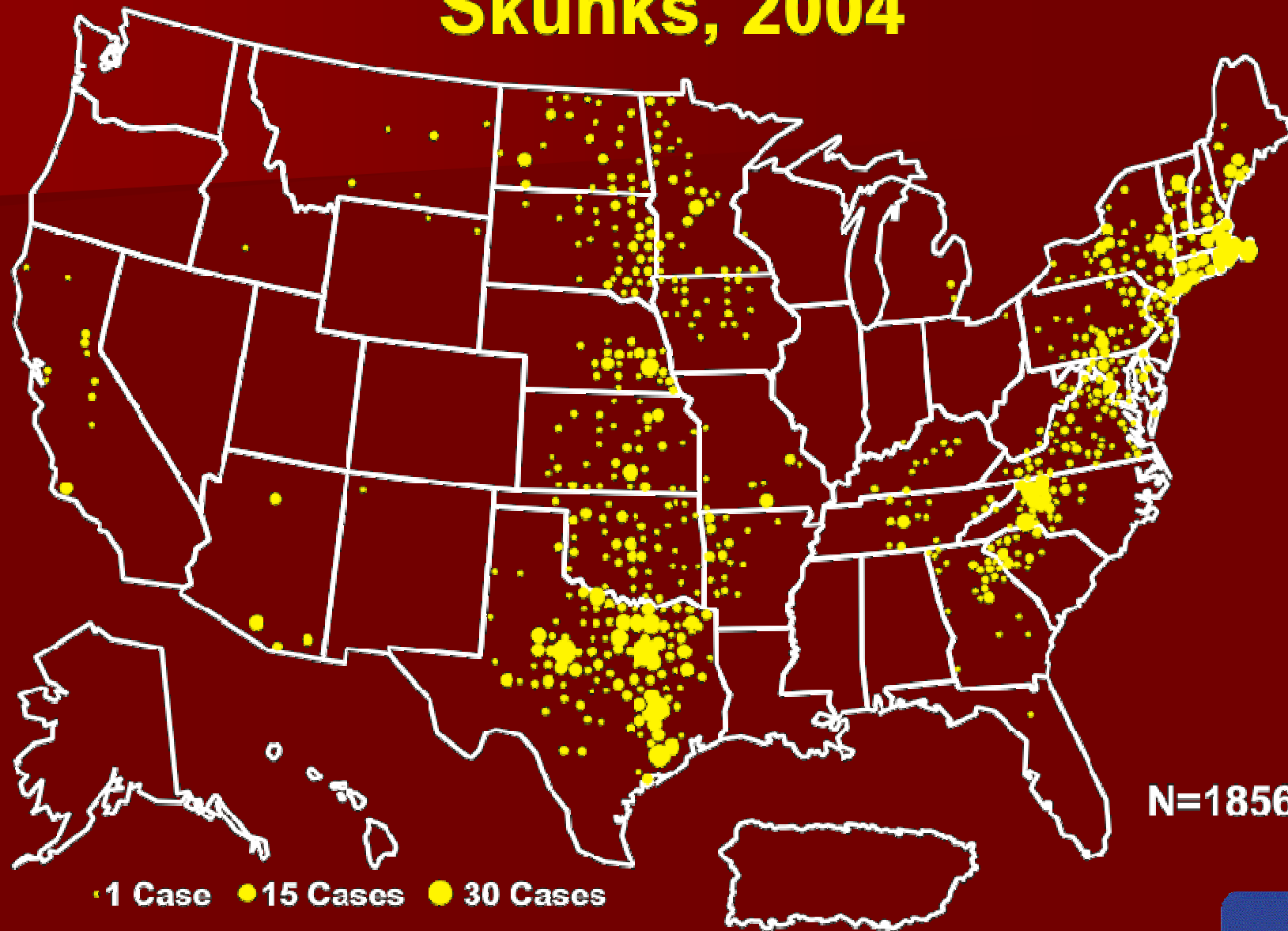


# Cats, 2004





# Skunks, 2004



# Lab Confirmed Rabid Animals 2006

- As of March 9th - 19 positive animals
- 1 bat, 9 skunks, 8 fox, 1 cat
- All rabid skunks are from Pima County – east side of Tucson
- Fox- 3 from Pinal, Pima, & Santa Cruz each, 1 – Gila County
- 1 fox from Organ Pipe National Monument, on trails
- 3 fox at Boyce Thompson Arboretum + additional decomposed
- Both parks posted signs to warn public



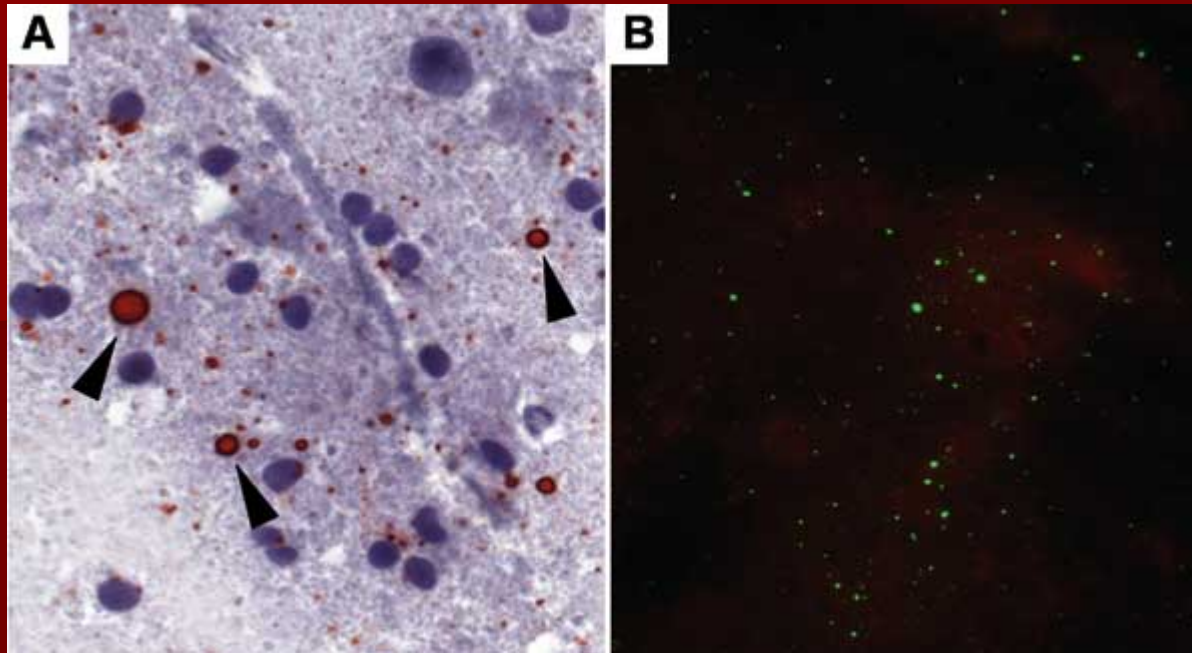
# New Field Test for Rabies

- Direct Rapid Immunohistochemistry Test (dRIT)
- Developed by CDC, under trial by CDC & USDA APHIS Wildlife Services, for surveillance only
- EID Feb 2006- evaluation in Tanzania Wildlife Park: Compared to DFA, traditional standard in rabies diagnosis, dRIT was 100% sensitive & specific
- In AZ, use by Wildlife Services tech, only on feral dog round ups & on wild animals (such as road kills)
- Cannot be used on animals with direct human or domestic animal contact
- Will be used in future for rabies surveillance in raccoons in eastern U.S.



# dRIT vs. DFA

- brain touch impressions as DFA
- observed by light microscopy
- diagnosis to be made in <1 hour
- evaluated dRIT on glycerol-preserved field samples
- Preservation with glycerol saline - convenient when refrigeration/freezing not promptly available



- Touch impression of rabies-positive Tanzanian domestic dog brain
- A) Brain stained by dRIT: rabies virus antigen appears as magenta inclusions (arrowheads) against blue neuronal hematoxylin counterstain  $\times 630$ .
- B) Immunofluorescent apple-green viral inclusions in the same brain processed by DFA. Magnification,  $\times 200$ .

# Evaluation Study

- 159 samples- brain stems from 2002 – 2004
  - 59 specimens (37.1%) positive for RABV antigen
  - 100 (62.9%) were negative by dRIT
- 100% agreement with DFA
- Assuming DFA-100% sensitive & specific, dRIT-100% sensitive & specific
- dRIT can be successfully performed on samples preserved in glycerol solution for 15 months or frozen for 24 months (duration of preservation in study) & in variable conditions of preservation
- potential value of dRIT for countries with limited diagnostic resources

# Patient Recovers from Clinical Rabies



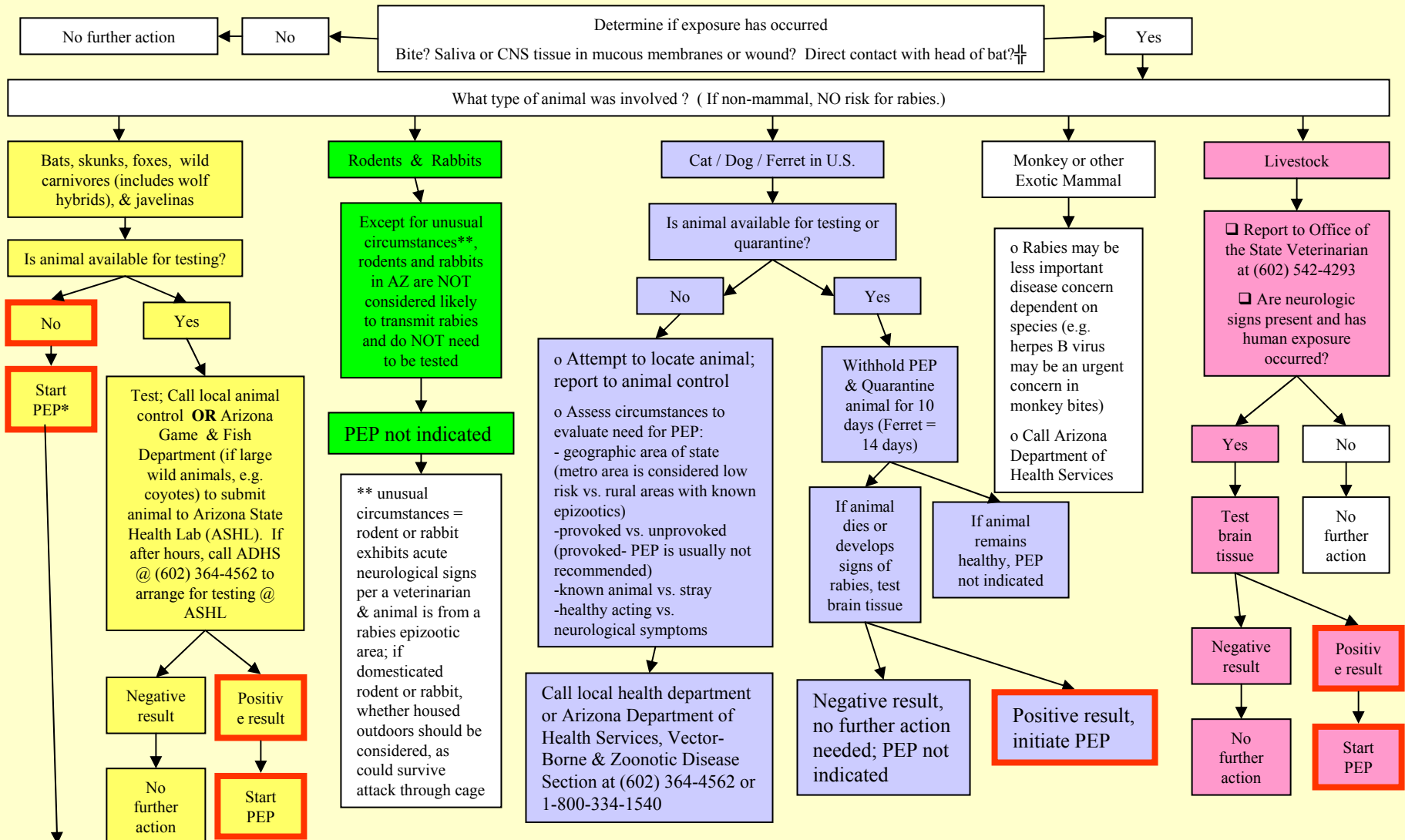
- 6th known occurrence of human recovery after rabies infection
- 1<sup>st</sup> documented recovery from clinical rabies by a patient who had not received either PEP before or after onset
- Recovering faster than expected – attending high school now
- New treatment??? -benefits of the regimen received by this patient remain to be determined

learning to use her arms & legs again & undergoing speech therapy



# Arizona Department of Health Services

## Rabies Risk Assessment For Human Exposure To Animals



\*There is no quarantine period established for wild animals, therefore **post exposure prophylaxis (PEP)** or testing brain of involved animal are the only appropriate measures if an exposure occurs.

⚡ Bites by high rabies incidence wildlife species such as bats, skunks, foxes, and to a lesser extent – bobcats and coyotes, warrant emergency testing after hours. PEP should be considered when direct contact between a human and a bat has occurred, unless exposed person is an adult and can be certain that a bite, scratch, or mucous membrane exposure did not occur. Persons who have been sleeping in a room with a bat, and persons with mental impairment or children who are found playing unsupervised with a rabid bat, should be considered for prophylaxis.

If additional questions, call your local health department or **Arizona Department of Health Services (ADHS)**, Vector-Borne & Zoonotic Disease Section at 1-800-334-1540 or (602) 364-4562

# Rabies Post-Exposure Management

Rabies vaccine & human rabies immune globulin (HRIG) should be administered according to the most current recommendations from the Advisory Committee on Immunization Practices; per *Human Rabies Prevention –United States, 1999. Centers for Disease Control and Prevention, MMWR 1999;48.*

**Local Treatment of Wounds:** Immediate & thorough washing of all bite wounds with soap & water for 10-15 minutes, AND irrigate with a virucidal agent such as povidone iodine solution. Tetanus prophylaxis and measures to control bacterial infections as indicated.

**Immunization:** The appropriate protocol for rabies post-exposure prophylaxis (PEP) depends on the exposed patient's previous rabies vaccination history

- ❑ Rabies vaccine: 1ml IM
- ❑ HRIG: 20 IU/kg body weight
- ❑ If anatomically feasible, the full dose of HRIG should be infiltrated around the wound(s). Any remaining HRIG should be administered IM at an anatomical site distant from a muscle used for rabies vaccine administration.

## Treatment Regimen for Patient Not previously vaccinated against rabies

Day 0 = date of initiation of treatment

Day	0	3	7	14	28
HRIG	x				
Rabies Vaccine	x	x	x	x	x

If HRIG is not given on day 0, HRIG may be administered within 7 days after rabies vaccine is first administered

## Treatment Regimen for Patient previously vaccinated\* against rabies

Day 0 = date of initiation of treatment

Day	0	3	7	14	28
HRIG	NOT INDICATED				
Rabies Vaccine	x	x	no	no	no

\* **Previously vaccinated** = person with history of a complete pre-vaccination (3 doses) with Human Diploid Cell Vaccine (Imovax), Purified Chick Embryo Cell Vaccine (RabAvert), or rabies vaccine adsorbed (RVA);

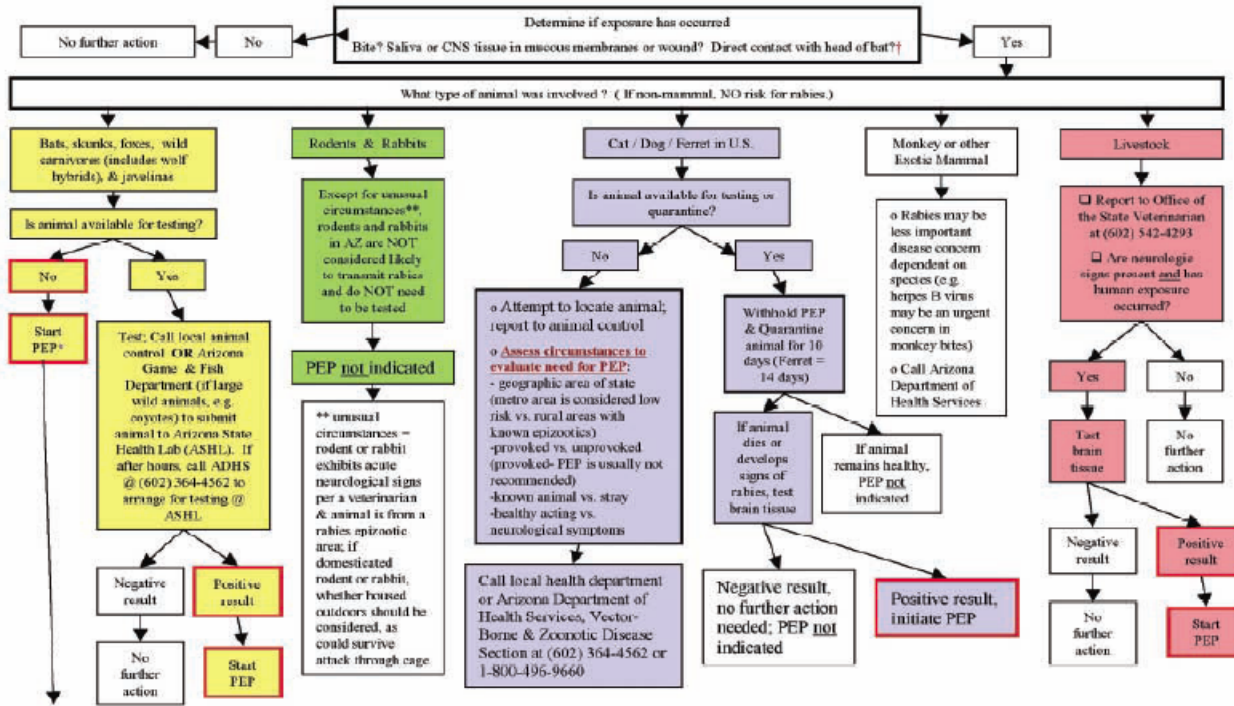
OR

person with prior vaccination with any other type of rabies vaccine (usually prior to c.1980) **with** a **prior** documented history of antibody response to rabies vaccination

# Arizona Department of Health Services

## Rabies Risk Assessment for Human Exposure to Animals and Rabies Post Exposure Management

### Rabies Risk Assessment For Human Exposure to Animals



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If additional questions, call your local health department or Arizona Department of Health Services (ADHS), Vector-Borne & Zoonotic Disease Section at 1-800-495-9660 or (602) 364-4562

### AFTER HOURS RABIES RISK ASSESSMENT CONTACTS

#### For Health Care Providers

If county health department staff who are knowledgeable about rabies risk assessment are not available, please call the Arizona Department of Health Services at: (602) 364-4562 or 1-800-496-9660.

#### CONTACT INFORMATION for RABIES RISK ASSESSMENT:

County	After-Hours On-call phone/pg.	During Business Hours
APACHE	Sheriff's Dispatch: (928) 337-4321	(928) 337-7607 Alternate: (928) 333-2415
COCHISE	Administrator on call (520) 249-3022	(520) 432-9464 OR (520) 249-0657
COCONINO	Pager (928) 913-6744	(928) 226-2771 OR (928) 226-2769
GILA	Rabies control 24/7 Pager Globe area (928) 402-5053 Payson area (928) 601-2344	(928) 425-5882 OR (928) 402-8817
GRAHAM	Sheriff's office (928) 428-3141	(928) 428-0110
GREENLEE	Sheriff's office (928) 865-4149	(928) 865-2601 OR (928) 865-2601
LA PAZ	(928) 669-2281	(928) 669-6155
MARICOPA	(602) 747-7111 OR Poison Control Center (602) 253-3334	Adult Immunization Pager (602) 779-1358 (dial number from which you are calling after beep)
MOHAVE	(928) 718-4927	(928) 718-4927
NAVAJO	Call ADHS	(928) 524-4750
PIMA	(520) 743-7987	(520) 740-8315
PINAL	Sheriff's Office dispatch (520) 866-5111 (800) 352-3796	(520) 866-7319
SANTA CRUZ	Call ADHS	(520) 375-7900 OR (520) 841-0477

## Rabies Post-Exposure Management

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# Arizona Department of Health Services





# EID article

- Lembo T, Niezgoda M, Velasco-Villa A, Cleaveland S, Ernest E, Rupprecht CE. Evaluation of a direct, rapid immunohistochemical test for rabies diagnosis. Emerg Infect Dis. 2006 Feb

# ORV for skunks

- persons w/ altered immunocompetence & persons for whom smallpox vaccination is contraindicated (e.g. pregnant, exfoliative skin condition) can have adverse event associated with contact with ORV
- Public education- (press releases, press conference, community meeting, door to door):
  - decrease the possibility of adverse events associated with V-RG
  - Pet owners must keep animals confined so that ORV can be found by skunks and other non-target wild species, instead of pets
  - Increase awareness among physicians & vets

## Skunks and Rabies

Questions and Answers  
About Oral Rabies Vaccine  
Spring 2005



# Adverse Event - ORV

- 44.5 million ORV distributed in U.S.
- Only one adverse event reported
- Ohio 2000 – 28 y.o. pregnant woman with epidermolytic hyperkeratosis
  - Mild abrasion on forearm & puncture of forefinger from dog bite, when tried to remove bait from her dog's mouth
  - Vesicular rash appeared 3 days p/ bite, progressed to 2 cm in diameter, and became necrotic
  - Fasciotomy and excision of necrotic dermis led to large scar
  - Generalized erythroderma, generalized exfoliation on face & neck
  - 34 days for symptoms to resolve, had normal baby
  - orthopox virus morphology found on EM of excised eschar, PCR positive for V-RG



# ORV in skunks – Flagstaff Quarantine

- approved by County Board of Supervisors on April 5<sup>th</sup>, begins on April 17<sup>th</sup> - up to 60 days
- Quarantine area – southeastern Flagstaff (N - Mt. Elden, E - Old Walnut Canyon, W – Schweitzer Canyon Rd, southern city limits,
- Trapping and/or transporting skunks not allowed w/o approval from HD
- All owned dogs & cats must be vaccinated and confined (also - if on walk, leash < 6ft).
- No pet food outdoors after sundown
- Compost & trash containers must be enclosed + skunk & rodent proof
- USDA – lay ORV & trap skunks on private property

